

## Labour Earnings Identity L'identité des gains du travail

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### Résumé de l'article

Ce que l'on pourrait appeler l'identité des gains a pour but d'établir un rapport précis entre la productivité, les gains, la part d'un facteur, et un indice des prix. Cette relation peut s'établir pour n'importe quel facteur, à condition que les termes statistiques soient définis d'une manière conforme. Le labeur présente le cas le plus intéressant, et nous pouvons écrire :

$$\frac{L_1/e_1}{L_0/e_0} = \frac{L_1/D_1}{L_0/D_0} \times \frac{D_1/d_1}{D_0/d_0} \times \frac{d_1/e_1}{d_0/e_0};$$

ou  $L$  = les gains des employés,  $e$  = la force ouvrière employée,  $D$  = produit national brut en termes monétaires,  $d$  = produit national en termes réels, et 1 et 0 sont des indices de temps. Évidemment certaines de ces conceptions globales (productivité, part des employés) sont maladroites et ne trouvent de justification que dans leur utilité. Un tableau du texte donne un exemple des relations en question en se servant des statistiques des comptes nationaux et de la force ouvrière. Il est montré qu'on ne peut pas négliger les changements dans les parts du revenu national qui reviennent aux facteurs si on cherche à établir les rapports exacts entre les gains, la productivité et les prix.

L'argument du texte comporte deux points principaux : il est difficile d'arriver à des statistiques plus convenables pour les termes de l'identité tout en gardant des définitions qui s'accordent d'une façon précise ; et de toute façon les résultats obtenus en employant des conceptions globales sont suffisamment exacts pour expliquer les changements des relations en question et ne varient pas trop des mouvements observés dans les statistiques plus exactes de la productivité et des salaires. Les intéressés peuvent s'adresser à l'auteur s'ils désirent les renseignements complémentaires à l'article.

Une dernière remarque : l'identité des gains ne peut pas servir comme moyen de prévision d'un ou de plusieurs de ces termes, car évidemment les termes situés des deux côtés de l'expression se réduisent à la même chose. Cependant il fournit un moyen facile d'évaluer les rapports observés dans une prévision des comptes nationaux entre les gains, les coûts, la productivité et les prix.

# Labour Earnings Identity

Arnold F. McKee

*An earnings identity may be constructed to relate consistently changes in factor earnings, share of income, productivity, unit costs and price deflator. The case of labour is the most relevant, and is readily illustrated by using GNP and Labour Force statistics. These 'global' changes may be linked up in workable fashion with changes in the Consumer Price Index and wage statistics. The attempt to refine the terms of the identity introduces problems of consistency of definition and improves little on the crude results.*

A price-stabilising rule has often been stated to the effect that an existing rate of increase in consumer prices will not speed up, provided it is not exceeded by the difference between current rates of increase in wages and productivity. There is a self-evident nature to the proposition which has received some refinement on a number of occasions.<sup>1</sup> The question usually not dealt with in the literature is how the proposition may be handled for purposes of current analysis and policy prescription, and this note comments on the point in the Canadian context.

One convenient form<sup>2</sup> which may be given the wage-price-productivity relation is :

$$\frac{D_1/d_1}{D_0/d_0} \equiv \frac{L_1/e_1}{L_0/e_0} \div \left( \frac{L_1/D_1}{L_0/d_0} \times \frac{d_1/e_1}{d_0/e_0} \right)$$

(price index)      (earnings)      (share)      (productivity)

where D is nominal GNP, d is real GNP, L is labour earnings, e is numbers employed, and o are time subscripts. Since the expression may be rewritten  $\frac{D_1/D_0}{d_1/d_0}$  etc., it is

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<sup>1</sup> For example, D.M. NOWLAN, « On Wage-Price Guidelines » *Canadian Journal of Economics*, Aug. 1968.

<sup>2</sup> My source for this form is unpublished memoranda (1968-70) by D. FAIRBARNs, Dept. of Consumer and Corporate Affairs, Ottawa.

evident that we have an identity with the RHS reducing to the LHS. It is also brought out, as is evident, that the relative share of labour (and other income recipients) is an essential element : labour earnings could exceed labour productivity by more than the rise in prices, provided its share of income rose.

One becomes aware that such common statements as « recent wage increases will be inflationary unless there is a healthy increase in productivity » or « poor productivity was responsible for a continued rapid rise in labour unit costs » express in one sense a causative relation but in another have only deceptive causality. For, while the change in productivity has real significance, when statistics are used to illustrate such statements one is only arranging in cause-effect relations the terms of an identity. A second point is that the change in factor unit costs emerges as comprising the change in factor share multiplied by the price deflator. We have

$$\frac{L_1/D_1}{L_0/D_0} \times \frac{D_1/d_1}{D_0/d_0} \equiv \frac{L_1/L_0}{D_1/D_0} \times \frac{D_1/D_0}{d_1/d_0} \equiv \frac{L_1/d_1}{L_0/d_0}$$

(share)                      (deflator)    (unit costs)

This relation is obvious in business analysis : if labour unit costs rise, and the proportion of net revenue going to labour is not to rise, selling prices must advance proportionately.

This 'labour earnings identity' may be applied exactly to statistics of the national accounts and labour force between any two points of time. Using published statistics of both in the simplest way,  $D/d$  would be the implicit price index,  $L/e$  earnings per employed member of the labour force (or wages in a loose sense),  $d/e$  real product per employed worker, and  $L/D$  labour share of national product. The statement would equally hold for physical quantity of capital respecting product input and income share, or for restricted concepts of national product and labour input (for example, commercial or manufacturing industries only and appropriate sub-divisions of the labour force). The difficulty is that suitable statistics may not be available, for physical quantity of capital for example, or existing statistics may require subdivision and rearrangement to allow analysis to be made on some consistent basis. Let us illustrate the 'global' approach<sup>3</sup> :

**TABLE I**  
**Percentage Changes in Selected Annual Figures : 1969 to 1971**

<i>Percent changes in annual figures</i>	<i>1969</i>	<i>1970</i>	<i>1971</i>
Wages and salaries per employed person, <sup>1</sup>	8.2	6.9	7.0
Implicit GNP deflator (1961 = 100)	4.5	4.5	3.3
Wages and salaries as share of GNP	1.7	1.0	0.7
Labour unit costs, <sup>2</sup>	6.2	5.6	4.0
Labour productivity, <sup>3</sup>	1.9	1.2	2.9

1 Wages and salaries, plus military pay, as shown in GNP statistics per employed person in Labour Force statistics.

2 Wages and salaries per dollar of real GNP.

3 Real GNP divided by number of employed persons.

All figures from *Bank of Canada Review*, January 1973, tables 46, 47 and 51.

It will be noticed that the percent change in labour earnings closely approximates the sum of the changes in unit costs and productivity, and that the change in unit costs approximates the sum of deflator and share changes. The calculations become precise if multiplication and division are used, as required by the formula, in place of addition and subtraction of proportionate changes. As the periods of comparison lengthen (say 1960 with 1970), the discrepancy grows though it can still be satisfactorily accounted for.<sup>3</sup>

Some comment should be made on the appropriateness of the terms used in this 'global' or all-GNP type of identity.

Labour productivity is usually studied in some restricted classification such as manufacturing industries or all commercial industries, preferably excluding farming. As is well known, educational and government services are valued at cost for national accounting purposes, so that in the final result productivity shows up as very low or zero; and on the other hand farming shows startlingly high results. What justification there can be for an all GNP (including depreciation!) productivity figure turns on the difficulty of obtaining suitable statistics for the other terms of the identity. For example, if a manufacturing or all-commercial

<sup>3</sup> At several points in the text statistical tables and graphs of some scope are required to illustrate or develop matters; these may be obtained on request from the author.

industries concept of productivity is used, it is necessary to use a restricted concept of GNP and to separate out labour earnings appropriately.<sup>4</sup> In turn, objections arise to the use of such restricted concepts: quite apart from the statistical difficulties posed, of how much usefulness will be the restricted implicit price index?

In this way one turns to considering whether global productivity (all real GNP per employed member of the labour force) differs markedly or unacceptably from the better measures of productivity obtained from more restricted sections of national product and the labour force. In my own view, examination of the relevant statistics shows that trends compare reasonably well, though productivity reflecting goods alone evidently rises as a trend above that including services. Over the short to medium term the change in all GNP productivity is a good enough indicator for policy purposes.

The labour share term encounters several problems: the earnings of unincorporated business include partly returns to labour and partly a return to property, so that one may argue a split should be attempted for inclusion in the labour share. This is not easily done in any satisfying way.<sup>4</sup> Next, the proportion of employed persons in the labour force has risen in recent decades, notably due to farmers leaving agriculture. Accordingly one might argue that the labour share should be adjusted to reflect this.<sup>5</sup> Some reply to these and other problems is that each attempted correction raises its own difficulties, and that, if one is interested in studying short period changes for policy setting purposes, the overall approach to labour share is not too objectionable.

One usually goes on to contrast the movement in the labour share over time with the changing share going to 'capital'. If this is identified with profits before taxes in the national accounts, several corrections again emerge as necessary. Returns to unincorporated enterprises should be split for inclusion of the property portion; and interest and investment income should be included, a step made more necessary by the fact that

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<sup>4</sup> App. I to Ch. 1 (pp. 27-9) of the *Final Report of Prices and Incomes Commission*, Ottawa, Information Canada, 1972 instances the sorts of modifications and corrections that can be attempted.

<sup>5</sup> S. PERTCHINIS, *Canadian Labour Economics*, Toronto, McGraw-Hill, 1970, pp. 434-5 illustrates such a correction. However, different results from those shown are obtained if one makes the same correction while using only the changing proportion of non-agricultural employees in non-agricultural employment. The effect of farmers leaving agriculture is more complex than it at first appears.

corporations (including financial enterprises) have as in the case of the U.S. probably become on the whole a net borrower of capital instead of a net lender in recent years.<sup>6</sup> Lumping together profits and interest and investment income, as shown in the national accounts, does indeed mitigate the sharp fall in profits as a share of GNP since the mid-1960's.

Price : Whereas in using the labour earnings identity the price index is the GNP implicit deflator or the deflator of some sub-group such as the private or commercial economy, what matters to wage-bargainers, the media and politicians is a cost-of-living index. Without entering into a discussion of the merits of different price indexes, some answer to the immediate problem is that in Canada the GNP deflator and the consumer price index tend to move reasonably well together over the longer term, after allowing for investment surges that from time to time cause the deflator to rise higher, and usually fairly well together in the near term.<sup>3</sup> A good deal of the deflation of GNP is carried out by indexes forming part of the overall consumer price index. As a result the difference between productivity and earnings increases over periods corresponds fairly well with the rise in the CPI, and discrepancies can usually be given a satisfactory explanation.

It is more difficult to link up quarterly changes in the CPI and GNP deflator, since the seasonal adjustment of series gives rise to problems and since percent changes in two series following the same path over a longer run can diverge sharply over a short period. Further, different weighting systems (Laspeyre for the CPI and, in effect, Paasche for GNP) are usually employed for each index. However, it can be shown when some smoothing technique such as the moving average is introduced that the CPI and the GNP deflator are on much the same course, so that for forecasting and for policy prescription purposes one can with the necessary allowances get from one to the other. It is more tenuous to attempt to link projected change in each, since forecast elements influence both.

Wage and salary earnings per employed person is already a concept fraught with difficulties, and for policy setting purposes one has to bridge the gap between this and new wage rate and salary agreements. Then,

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<sup>6</sup> Cf. G. PERRY, « Notes and Numbers on the Profits Squeeze », *Brookings Papers on Economic Activity*, 3, 1970 ; The Brookings Institution, Washington. *Survey of Current Business Figures*, U.S. Dept. of Commerce ; eg. July 1970, p. 22, figures show the switch from net lender to net borrower on the part of the corporate sector in 1967-68.

supposing one does frame a stabilising rule for the latter, the detail of an incomes policy enters to adapt it to the multiplicity of wage and salary settlements. The most useful statistics on wage settlements in Canada relate to 'basic wage rates in force' under industrial agreements covering unions with over 500 employees, and to new rates concluded under 1-3 year agreements for this group of larger unions (about 18% of the labour force). The attempt to get from the latter to the prediction of how base rates in force will move over the same period is not smooth sailing. At all events, three series — base rates in force, weekly wages and salary (industrial composite), and labour income per employed person — move reasonably well together over the longer term, and in the short run the latter two series are surprisingly close.<sup>3</sup> All GNP wages and salaries per employed person has a faster rising trend over the long run, doubtless owing to the growth in fringe benefits.

The conclusion is that, given the type of identity outlined, complex problems arise as to how one should define its terms in order to obtain useful and valid results. My own experience is that the overall national product-employed labour force results are sufficiently good for broad policy guidance purposes and that the attempt to improve on them with better definitions of terms is not worth the trouble for what may be gained.<sup>4</sup> If this is so, a first use of the labour earnings identity is to enable one to trace on a simple GNP-labour force basis changing relationships in such key variables as price, earnings and productivity. Desirable targets can be set for the near and medium terms. Since the relations in question are simple, one feels that they could be used in public relations fashion to increase understanding of the inflationary process. Of course, statistical and other problems remain in getting from these terms to the CPI and actual wage and fringe benefits where the negotiating forces do battle.

A second use is that the earnings identity furnishes a quick check on predictions of GNP components. These are usually carried out by building up the expenditure and income sides of the national accounts, and related accounts such as personal income, government revenue and expenditure, etc. After the leading categories have been obtained, the next stage is to analyse what picture they present of unit costs, productivity, etc., in relation to the business cycle, and for this purpose, the earnings identity shows up key relations in a consistently defined way. It would be strange to accept a GNP forecast, even if it were the product of skillful work, that did not show paths for central variables plausible

in relation to be momentum of the economy. But, after the supporting role of the earnings identity, it cannot be used as point of departure to forecast one of its component variables : one is dealing with an identity, so that any attempt to deduce a LHS variable from some arrangement of RHS variables is a delusion.<sup>7</sup>

### L'identité des gains du travail

Ce que l'on pourrait appeler l'identité des gains a pour but d'établir un rapport précis entre la productivité, les gains, la part d'un facteur, et un indice des prix. Cette relation peut s'établir pour n'importe quel facteur, à condition que les termes statistiques soient définis d'une manière conforme. Le lauréat présente le cas le plus intéressant, et nous pouvons écrire :

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<sup>7</sup> As one example among many, in the *National Institute Review*, N.I.E.S.R., London for May 1970 (p. 17) the GNP deflator is predicted on the basis of posited labour unit costs of real GNP. But, as the above article shows, such costs are derived as the deflator multiplied by the labour share changes : so, in assuming the course of labour unit costs one has also assumed the course of the deflator, if share changes are ruled out.